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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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MOTOROLA INC 600 NORTH US HIGHWAY 45 W4 - 39Q LIBERTYVILLE, IL 60048-5343			EXAMINER CHANG, JENNIFER F	
			ART UNIT	PAPER NUMBER
			2821	
			NOTIFICATION DATE	DELIVERY MODE
			02/06/2009	ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

DOCKETING.LIBERTYVILLE@MOTOROLA.COM  
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# Office Action Summary

**Application No.**

10/596,526

**Applicant(s)**

SU ET AL.

**Examiner**

JENNIFER F. CHANG

**Art Unit**

2821

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 22 August 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-24 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 15 June 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-8508)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

**DETAILED ACTION**

1. Claims 1-24 are presented for examination.

***Priority***

2. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

***Claim Rejections - 35 USC § 102***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1-24 are rejected under 35 U.S.C. 102(b) as being anticipated by Wong (US 5,006,859).
5. As to claim 1, Wong teaches an antenna radiator assembly comprising:  
a circuit board (Fig. 3) formed from a plurality of dielectric layers (36, 52, Fig. 3), the dielectric layers with electrical conductors (48, 14, Fig. 3) thereon, the electrical conductors including a feed point conductive trace (48, Fig. 3) and at least one conductive sheet comprising a ground plane (14, Fig. 3);  
at least one antenna radiator element (12, Fig. 3) spaced from said circuit board and when viewed in plan view there is an overlapping area where at least most of a surface area of the

antenna radiator element overlaps a surface area of the circuit board thereby forming a sandwiched dielectric region therebetween;

a feed point connector (24, Fig. 3) coupling the antenna radiator element to the feed point conductive trace (where the coupling in Wong is capacitive rather than electrical); and

a ground connector (26, Fig. 3) coupling the antenna radiator element to the ground plane (where the coupling in Wong is capacitive rather than electrical),

wherein there is at least one of the circuit board dielectric layers in the sandwiched dielectric region disposed between the antenna radiator element and the ground plane (36, Fig. 3).

As to claim 2, Wong teaches at least one of the circuit board dielectric layers in the sandwiched dielectric region disposed between the antenna radiator element and the feed point conductive trace (36 and 52, Fig. 3).

As to claim 3, Wong teaches the at least one of the circuit board dielectric layers in the sandwiched dielectric region have an area extending across the complete overlapping area (both 36 and 52 overlap with radiator 12, Fig. 3).

As to claim 4, Wong teaches the feed point conductive trace (48, Fig. 3) and the at least one conductive sheet (14, Fig. 3) are the only the electrical conductors supported by the circuit board and extending into the overlapping area.

As to claim 6, Wong teaches all of the dielectric layers forming the circuit board (36, 52, Fig. 3) are disposed between the antenna radiator element and the feed point conductive trace.

As to claim 7, Wong teaches the feed point conductive trace (48, Fig. 3) is mounted on a first one of the dielectric layers (52, Fig. 3) when outside the overlapping area and when the feed

point conductive trace is extending into the overlapping area it is mounted on a different one of the dielectric layers (cap 40 on top of post 38 of feed connector is mounted on the dielectric layer 36, Fig. 3).

As to claim 9, Wong teaches the at least one conductive sheet is a first conductive sheet (50, Fig. 3) coupled to another conductive sheet (cap 40 on top post 38 of feed connector 24, Fig. 3) on a different dielectric layer (36, Fig. 3).

As to claim 10, Wong teaches the first conductive sheet is coupled to another conductive sheet by a plurality of vias (54, Fig. 3).

As to claim 11, Wong teaches the vias are suitably spaced centre to centre by no more than  $1/100^*$  of a wavelength when the element is resonating at a pre-defined operating frequency ("aperture extending as a channel," col. 4, line 5).

As to claim 12, Wong teaches the vias are spaced along an axis ("channel," col. 4, line 5) transverse to a longitudinal axis of the circuit board (Fig. 3).

### ***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any

evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(c), (f) or (g) prior art under 35 U.S.C. 103(a).

8. Claims 13-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wong.

As to claim 13, Wong teaches the antenna assembly substantially as claimed as applied to claim 1 above, and further teaches a radio communications assembly comprising a transceiver (46, Fig. 3) coupled to at least one antenna radiator element but does not explicitly teach the coupling is via a radio frequency amplifier. However, frequency amplifiers are well known in the art and it would have been obvious to one of ordinary skill to couple the radiator to the transceiver via a frequency amplifier to improve the signal quality so that it can be properly interpreted by the transceiver.

As to claim 14, Wong teaches at least one of the circuit board dielectric layers in the sandwiched dielectric region disposed between the antenna radiator element and the feed point conductive trace (36 and 52, Fig. 3).

As to claim 15, Wong teaches the at least one of the circuit board dielectric layers in the sandwiched dielectric region have an area extending across the complete overlapping area (both 36 and 52 overlap with radiator 12, Fig. 3).

As to claim 16, Wong teaches the feed point conductive trace (48, Fig. 3) and the at least one conductive sheet (14, Fig. 3) are the only the electrical conductors supported by the circuit board and extending into the overlapping area.

As to claim 18, Wong teaches all of the dielectric layers forming the circuit board (36, 52, Fig. 3) are disposed between the antenna radiator element and the feed point conductive trace.

As to claim 19, Wong teaches the feed point conductive trace (48, Fig. 3) is mounted on a first one of the dielectric layers (52, Fig. 3) when outside the overlapping area and when the feed point conductive trace is extending into the overlapping area it is mounted on a different one of the dielectric layers (cap 40 on top of post 38 of feed connector is mounted on the dielectric layer 36, Fig. 3).

As to claim 21, Wong teaches the at least one conductive sheet is a first conductive sheet (50, Fig. 3) coupled to another conductive sheet (cap 40 on top post 38 of feed connector 24, Fig. 3) on a different dielectric layer (36, Fig. 3).

As to claim 22, Wong teaches the first conductive sheet is coupled to another conductive sheet by a plurality of vias (54, Fig. 3).

As to claim 23, Wong teaches the vias are suitably spaced centre to centre by no more than  $1/100^*$  of a wavelength when the element is resonating at a pre-defined operating frequency ("aperture extending as a channel," col. 4, line 5).

As to claim 24, Wong teaches the vias are spaced along an axis ("channel," col. 4, line 5) transverse to a longitudinal axis of the circuit board (Fig. 3).

9. Claims 5 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wong in view of Shapiro (US 5,001,492).

Wong teaches the antenna assembly substantially as claimed as applied to claims 1 and 13 above, does not teach all of the dielectric layers forming the circuit board are disposed between the antenna radiator element and the ground plane.

Shapiro teaches a multi-layered dielectric circuit board wherein the outer metal sheet of the circuit board forms the ground plane and the feed conductor is disposed on a middle layer (col. 1, lines 23-29)333. It would have been obvious to one of ordinary skill in the art to modify the circuit board of Wong by placing the ground plane on the outer surface rather than on a middle layer as taught by Shapiro. The claim would have been obvious because the substitution of one known element for another would have yielded predictable results to one of ordinary skill in the art at the time of the invention.

10. Claims 8 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wong in view of Jensen (US 5,315,753).

Wong teaches the antenna assembly substantially as claimed as applied to claims 1 and 13 above, and further teaches the feed point conductive trace is on an outer dielectric layer surface (52, Fig. 3) of the circuit board that is facing away from the antenna radiator element, but does not teach that the conductive sheet is also on an outer dielectric layer surface of the circuit board that is facing away from the antenna radiator element.

Jensen teaches a dielectric circuit board wherein the ground plane (144, Fig. 4) and the feed conductor (158, Fig. 4) are on an outer dielectric layer surface (144, Fig. 4) of the circuit board that is facing away from the antenna radiator element (146, Fig. 4). It would have been obvious to one of ordinary skill in the art to modify the antenna assembly of Wong by disposing both the feed conductor and the ground plane on an outer surface of the circuit board. The claim



would have been obvious because the substitution of one known element for another would have yielded predictable results to one of ordinary skill in the art at the time of the invention.

### *Conclusion*

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JENNIFER F. CHANG whose telephone number is (571) 270-3831. The examiner can normally be reached on Monday-Friday 8:00am - 4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Douglas Owens can be reached on (571) 272-1662. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/JENNIFER F CHANG/  
Examiner, Art Unit 2821

/Douglas W Owens/  
Supervisory Patent Examiner, Art Unit 2821  
February 2, 2009